T-29-21

SILICON PLANAR EPITAXIAL TRANSISTORS

N-P-N transistors in plastic TO-92 envelopes, primarily intended for low-noise input stages in tape recorders, hi-fi amplifiers and other audio-frequency equipment.

QUICK REFERENCE DATA

			BC549	BC550	
Collector-emitter voltage (V_{BE} = 0)	V_{CES}	max	30	50	V
Collector-emitter voltage (open base)	V_{CEO}	max	30	45	V
Collector current (peak value)	I_{CM}	max	200	200	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max	500	500	mW
Junction temperature	T_j	max	150	150	°C
D.C. current gain I_C = 2 mA; V_{CE} = 5 V	h_{FE}	> <	200 800	200 800	
Transition frequency I_C = 10 mA; V_{CE} = 5 V	f_T	typ	300	300	MHz
Noise figure at R_S = 2 kΩ I_C = 200 μA; V_{CE} = 5 V					
f = 30 Hz to 15 kHz	F	typ <| 1,4 4	1,4 3	dB dB	
f = 1 kHz; B = 200 Hz	F	typ	1,2	1	dB
f = 10 Hz to 50 Hz (equivalent noise voltage)	V_n	<	–	0,135	μV

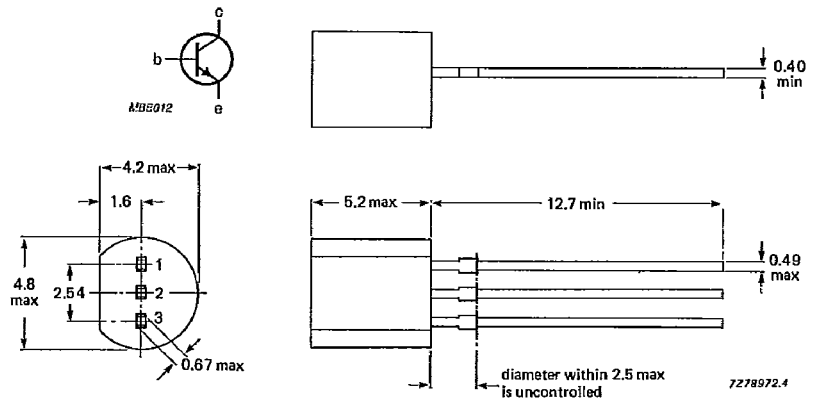
MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-92.

Pinning

1 = emitter
2 = base
3 = collector



Capability approved to CECC NECC-C-002

PHILIPS INTERNATIONAL 56E D 7110826 0042027 44T PHIN

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RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

			BC549	BC550	
Collector-base voltage (open emitter)	V_{CBO}	max.	30	50	V
Collector-emitter voltage (V_{BE} = 0)	V_{CES}	max.	30	50	V
Collector-emitter voltage (open base)	V_{CEO}	max.	30	45	V
Emitter-base voltage (open collector)	V_{EBO}	max.	5	5	V
Collector current (d.c.)	I_C	max.		100	mA
Collector current (peak value)	I_{CM}	max.		200	mA
Emitter current (peak value)	$-I_{EM}$	max.		200	mA
Base current (peak value)	I_{BM}	max.		200	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.		500	mW
Storage temperature	T_{stg}			−65 to + 150	°C
Junction temperature	T_j	max.		150	°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	0,25 K/mW
From junction to case	$R_{th\ j\text{-}c}$	=	0,15 K/mW

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current				
I_E = 0; V_{CB} = 30 V	I_{CBO}	<	15	nA
I_E = 0; V_{CB} = 30 V; T_j = 150 °C	I_{CBO}	<	5	μA
Base emitter voltage*				
I_C = 2 mA; V_{CE} = 5 V	V_{BE}	typ.	660 580 to 700	mV mV
I_C = 10 mA; V_{CE} = 5 V	V_{BE}	<	770	mV
Saturation voltages **				
I_C = 10 mA; I_B = 0,5 mA	V_{CEsat}	typ. <	90 250	mV mV
	V_{BEsat}	typ.	700	mV
I_C = 100 mA; I_B = 5 mA	V_{CEsat}	typ. <	200 600	mV mV
	V_{BEsat}	typ.	900	mV

* V_{BE} decreases by about 2 mV/K with increasing temperature.
** V_{BEsat} decreases by about 1,7 mV/K with increasing temperature.

Collector capacitance at f = 1 MHz $I_E = I_e = 0$; $V_{CB} = 10$ V	C_c	typ.	2,5 pF
Emitter capacitance at f = 1 MHz $I_C = I_c = 0$; $V_{EB} = 0{,}5$ V	C_e	typ.	9 pF
Transition frequency at f = 35 MHz $I_C = 10$ mA; $V_{CE} = 5$ V	f_T	typ.	300 MHz
Small signal current gain at f = 1 kHz $I_C = 2$ mA; $V_{CE} = 5$ V	h_{fe}		125 – 900

Noise figure at $R_S = 2$ kΩ
$I_C = 200$ μA; $V_{CE} = 5$ V

			BC549	BC550
f = 30 Hz to 15 kHz	F	typ.	1,4	1,4 dB
		<	4	3 dB
f = 1 kHz; B = 200 Hz	F	typ.	1,2	1 dB
		<	4	4 dB

Equivalent noise voltage at $R_S = 2$ kΩ
$I_C = 200$ μA; $V_{CE} = 5$ V

f = 10 Hz to 50 Hz; $T_{amb} = 25$ °C	V_n	max.	–	0,135 μV

			BC549B BC550B	BC549C BC550C
D.C. current gain $I_C = 10$ μA; $V_{CE} = 5$ V	h_{FE}	typ.	150	270
		>	200	420
$I_C = 2$ mA; $V_{CE} = 5$ V	h_{FE}	typ.	290	520
		<	450	800

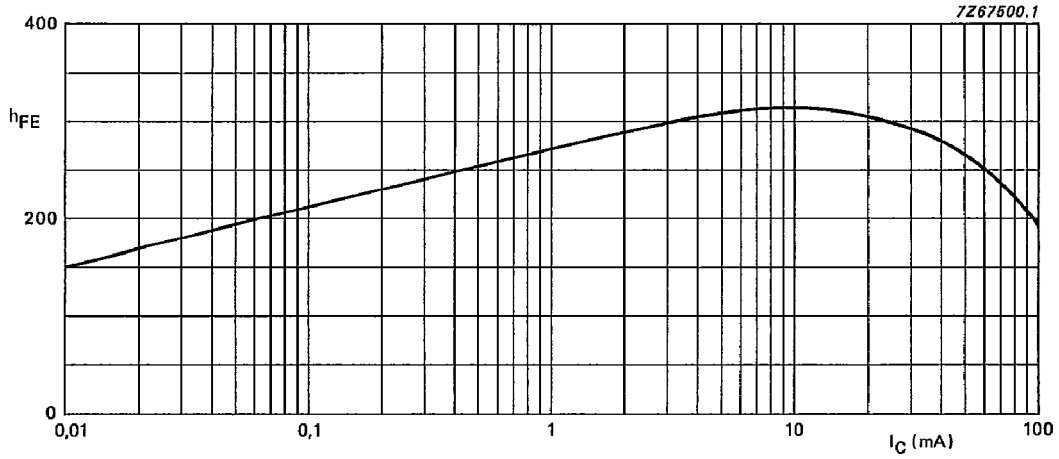

Fig. 2 BC549B and BC550B; V_{CE} = 5 V; T_j = 25 °C; typical values.

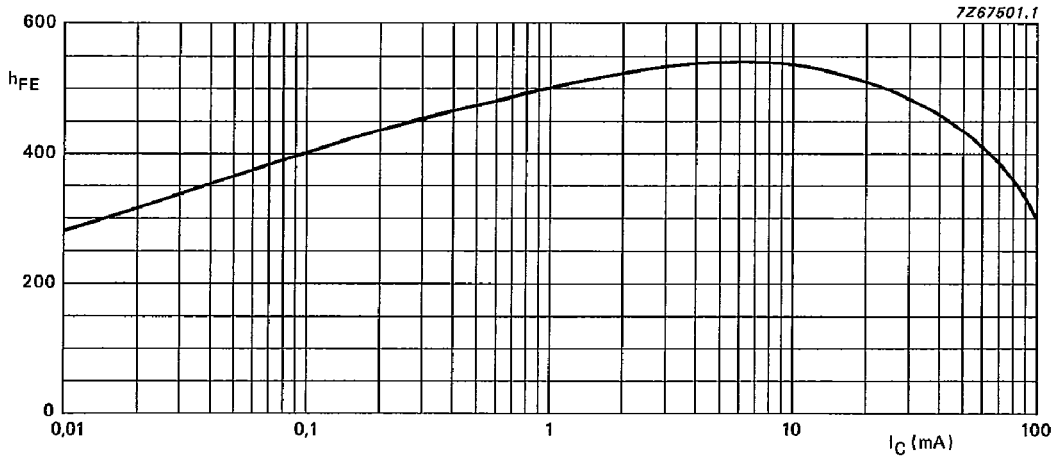

Fig. 3 BC549C and BC550C; V_{CE} = 5 V; T_j = 25 °C; typical values.

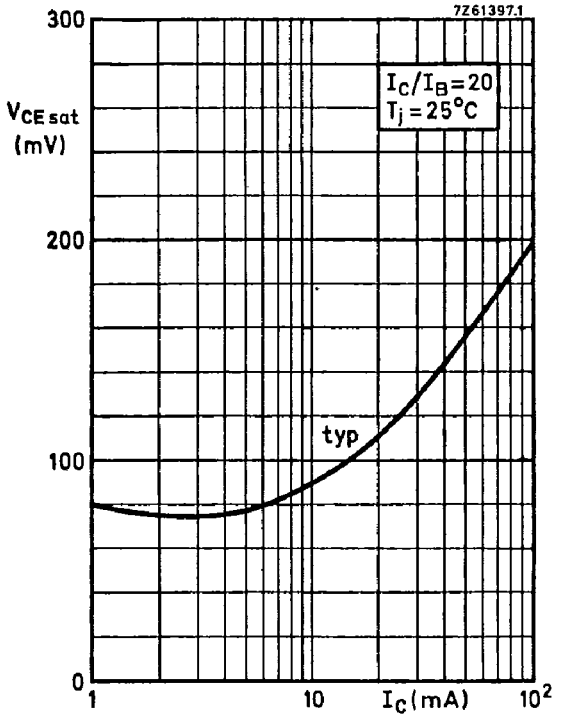

Fig. 4.

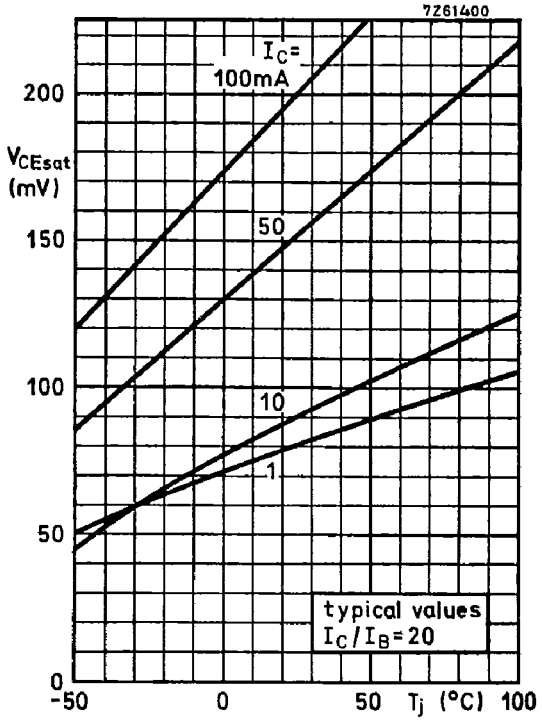

Fig. 5.

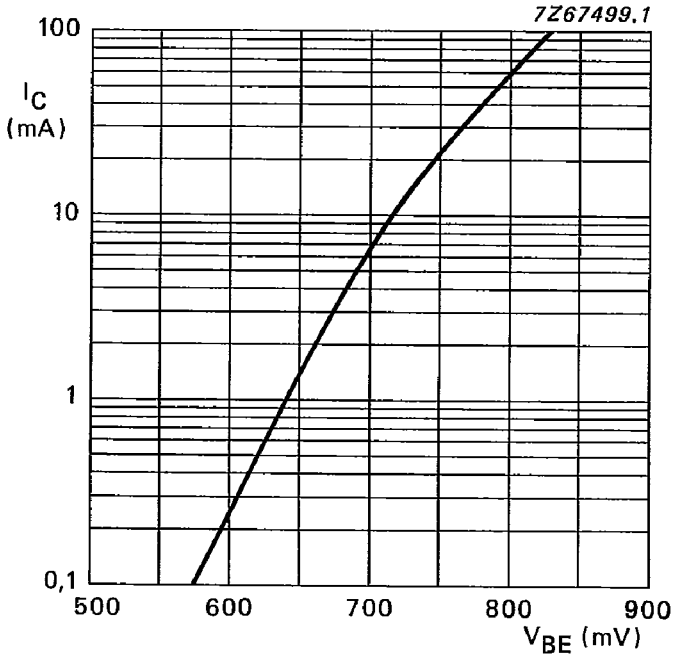

Fig. 6 V_{CE} = 5 V; T_j = 25 °C; typical values.

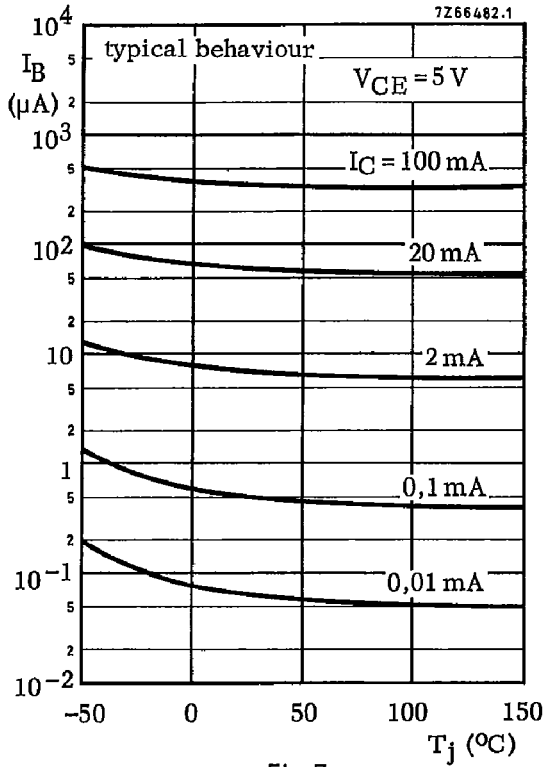

Fig. 7.

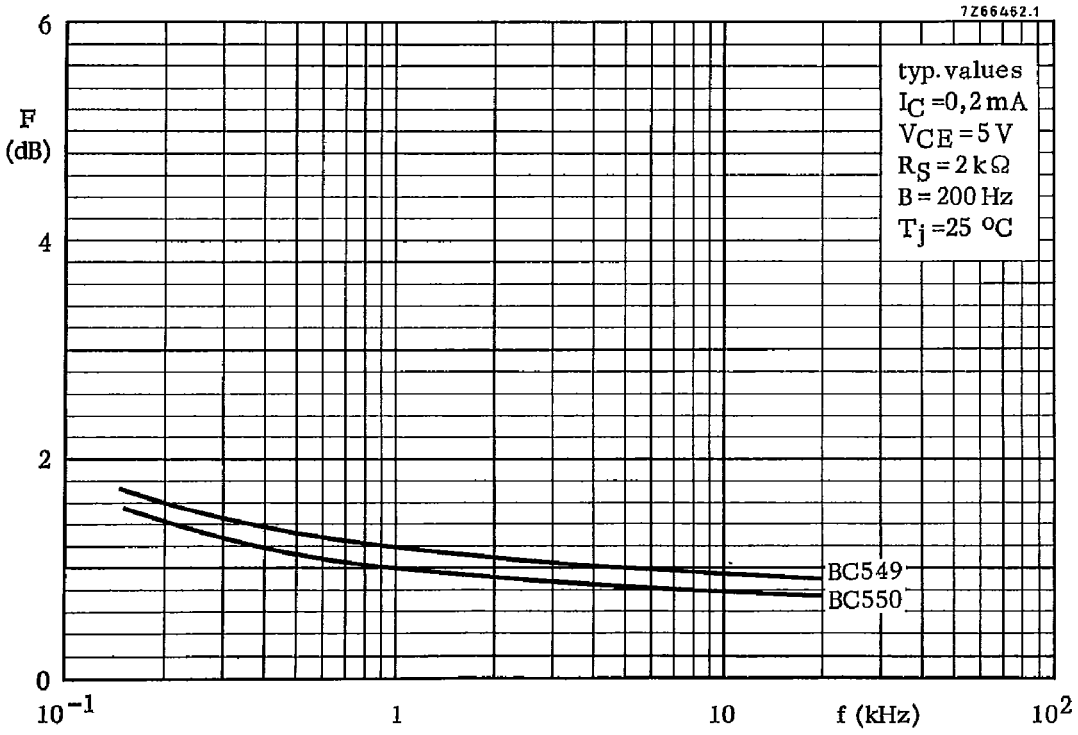

Fig. 8.

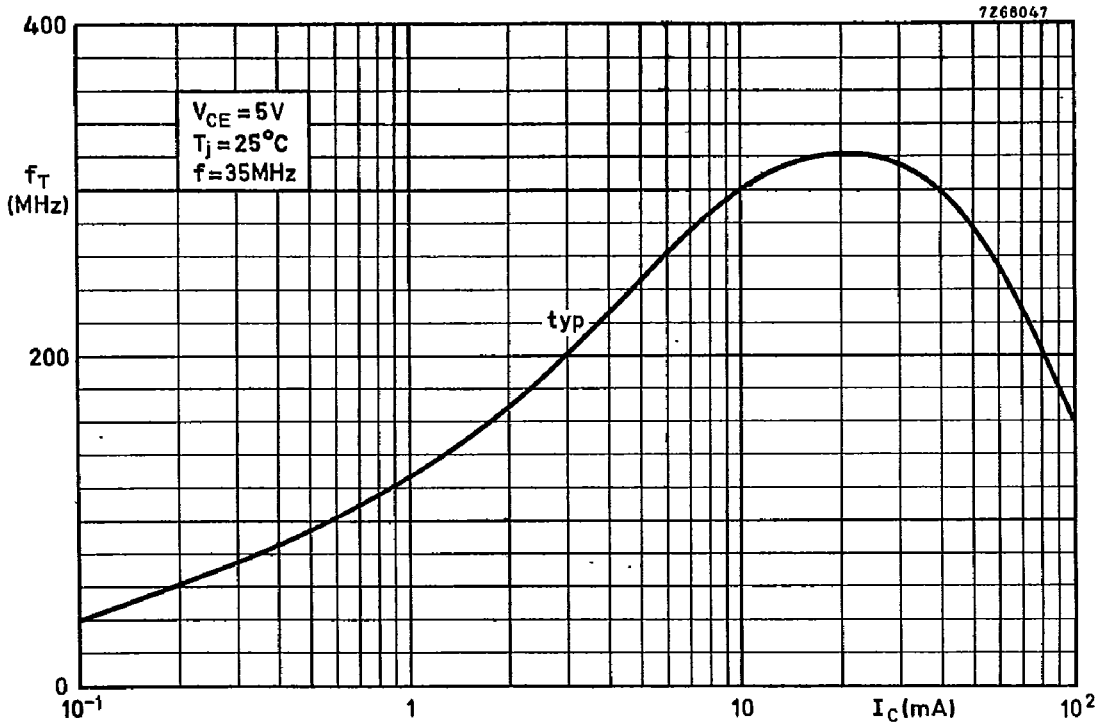

Fig. 9.

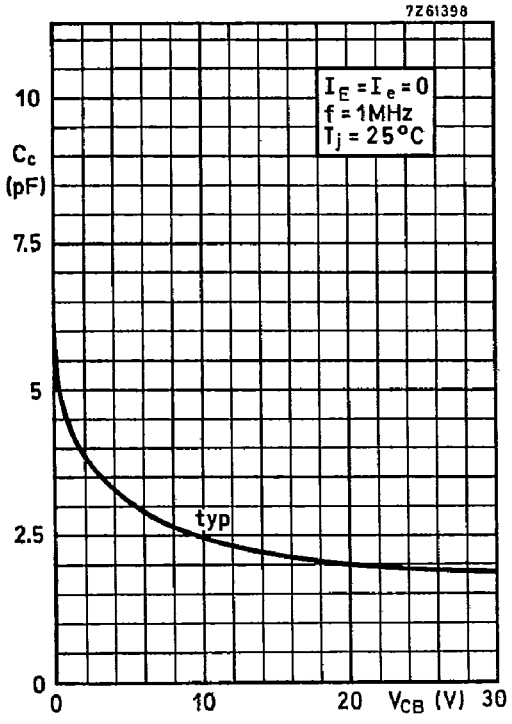

Fig. 10.

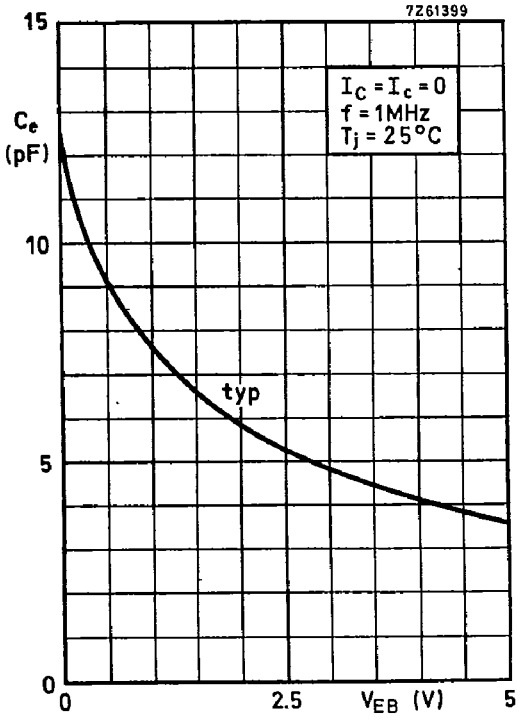

Fig. 11.

Curves of constant noise figure

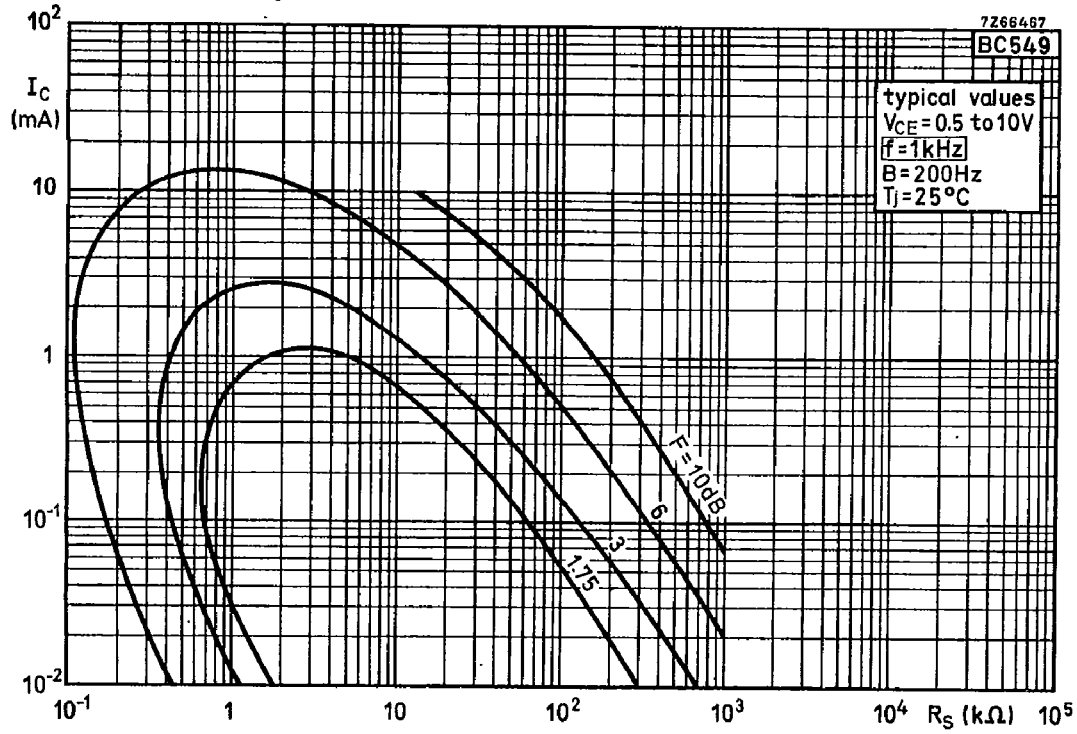

Fig. 12.

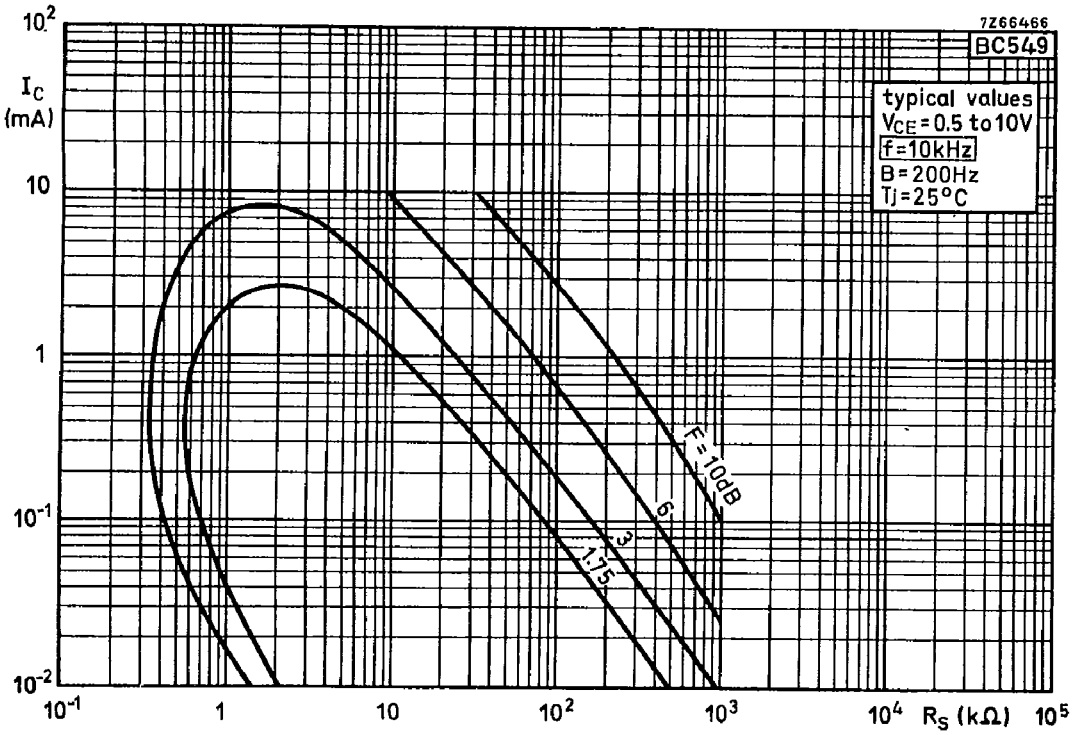

Fig. 13.

Curves of constant noise figure

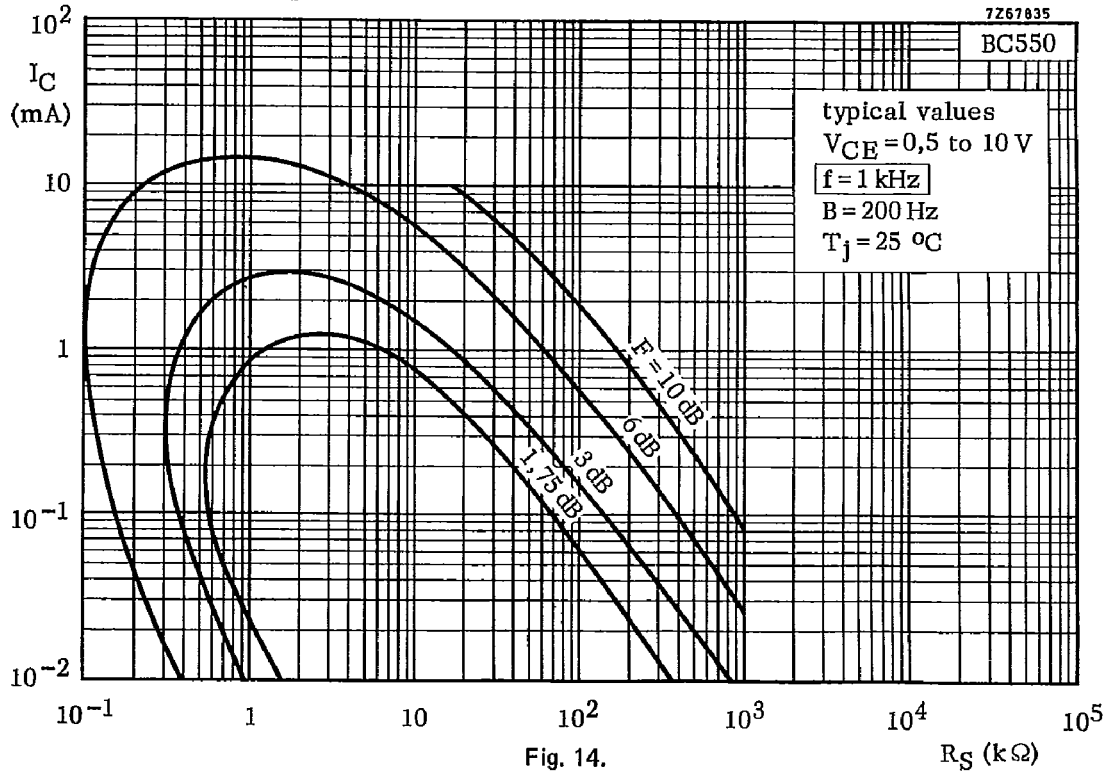

Fig. 14.

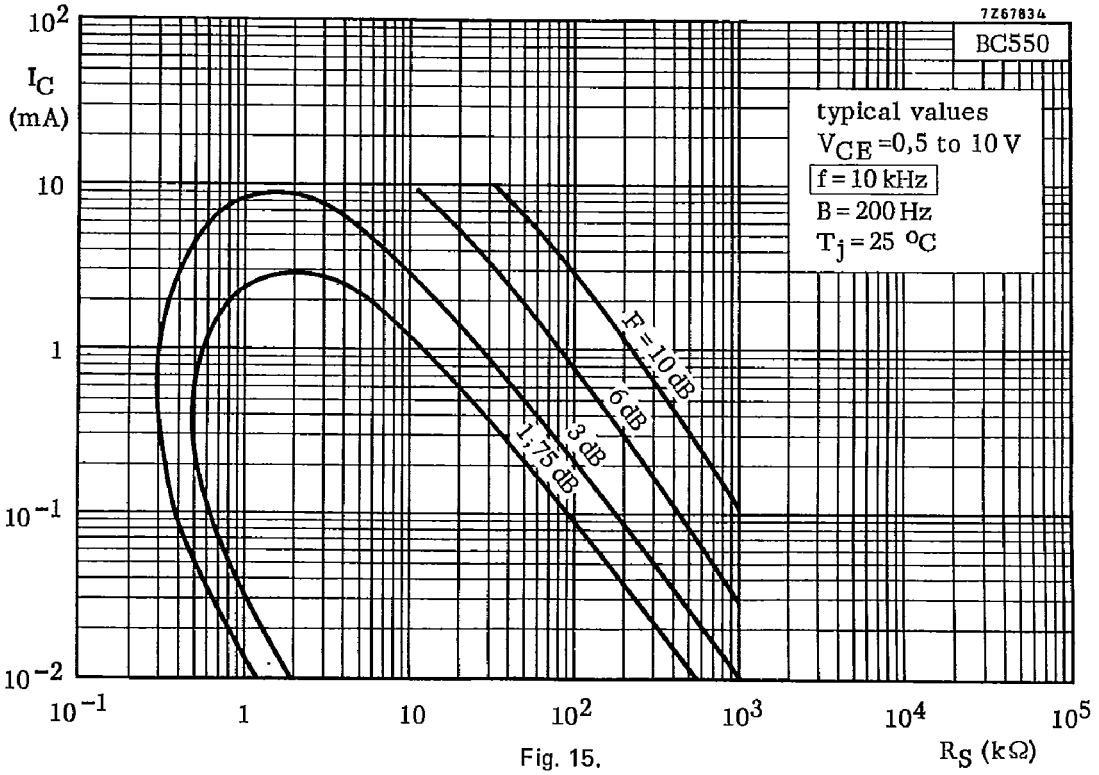

Fig. 15.